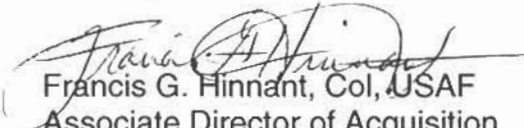




UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL ENVIRONMENTAL SATELLITE, DATA,  
AND INFORMATION SERVICE  
Washington, D.C. 20233

MEMORANDUM FOR: SAF/PAS  
Attn: June F. Forte  
1690 Air Force Pentagon - 2D227  
Washington DC 20330-1690

JAN 4 2000

FROM:   
Francis G. Hinnant, Col, USAF  
Associate Director of Acquisition  
NPOESS Integrated Program Office  
8455 Colesville Rd, Suite 1450  
Silver Spring, MD 20910

SUBJECT: Abstract-The Preliminary Design of the Ozone Mapping and  
Profiler Suite (OMPS)

Enclosed are the required ten (10) copies of the subject abstract paper. This paper is requested for public release and discussion during the International Quadrennial Ozone Symposium to be held at the Hokkaido University, Sapporo, Hokkaido Japan from 3-8 July 2000. This Symposium will cover all aspects of the atmospheric ozone sciences. The associated "oral" presentation will be submitted for public release under a separate cover. The presenter will be Dr. Paul Graf of Ball Aerospace and Technologies Corporation.

The program office has reviewed the information and found it appropriate for public disclosure without change.

Point of contact on this matter is Capt Elisa Kang, NPOESS IPO/ADA at 301-427-2084 (Ext. 142).

cc: ADA (E. Kang)

Attachment: Abstract—10 copies



Title: The Preliminary Design of the Ozone Mapping and Profiler Suite (OMPS)

Authors: GRAF, Paul H. (1); BECKER, Ira (1); CHRISP, Michael (1); DITTMAN, Michael G. (1); FOWLER, William (1); HENDERSHOTT, Paul (1); JAROSS, Glen (2); LARSEN, Jack. (2); MEHALKO, Phil (1); MICHAELS, Dan (1); MINERVA, Vince (1); RATHBURN, Roger (1); RODRIGUEZ, Juan V. (1); SEFTOR, Colin (2); SCHWIESOW, Ron L. (1); SWISSLER, Tom; (2); TARDE, Rich (1); TRUMBULL, Robert E. (1); WELLEMEYER, Charles (2)

- (1) Ball Aerospace and Technologies Corp. Boulder, Colorado, US
- (2) Raytheon Technical Services Company; Lanham, Maryland, US

The Ozone Mapping and Profiler Suite (OMPS) is a new US program to monitor ozone from space. It was the first suite selected to fly on the National Polar-orbiting Operational Environmental Satellite System (NPOESS) spacecraft - the replacement program for both the National Oceanic and Atmospheric Administration (NOAA) Polar-Orbiting Operational Environmental Satellite (POES) and DOD Defense Meteorological Satellite Program (DMSP) systems. OMPS will provide more than 20 years of total column and vertical profile ozone data. These products will continue the global, daily data products similar to, but of higher fidelity than, those from Solar Backscatter Ultraviolet radiometer (SBUV)/2 and Total Ozone Mapping Spectrometer (TOMS).

We describe the sensor and system performances based on the results of a funded, competitive, risk reduction program that culminated with our preliminary design review. The design requirements, data product content, quality, and timeliness and the baseline performances of both sensors are described.

The OMPS system is comprised of a flight hardware suite of two sensors and a ground processing and algorithm segment that generates geolocated radiances and ozone data products. The flight system fits comfortably within the allocated spacecraft accommodation parameters of 45 kg, 45 watts, 40 kbps peak and 0.106 m<sup>3</sup> (54 cm x 35 cm x 56 cm). The nadir-viewing sensor is a wide field-of-view, push-broom sensor that feeds two separate spectrometers. The total column spectrometer measures the scene radiance between 300 to 380 nm with a resolution of 1 nm sampled at 0.42 nm and a 24-hour ground revisit time. These measurements are used to generate total column ozone data with 46x50 km (at nadir), constant-angle ground pixels. The nadir profile spectrometer measures between 250 and 310 nm with the same spectral sampling, but only a single ground pixel of 250x250 km. The limb sensor measures the along track limb scene radiance with a 1 km vertical sampling in the spectral range of 290 to 1000 nm. Three cross track slits, separated by 250 km, are imaged onto a single Charged-Couple Device (CCD) (identical to both nadir CCDs) to provide for better than 7-day ground revisit times.

The first launch of the NPOESS 13:30 afternoon spacecraft, planned to carry an OMPS sensor suite, is not expected before 2008, but earlier flights of opportunity are being considered for OMPS.

Preference for an 'Oral' presentation in Session #1-Observations and analysis of total and vertical ozone distributions

Details for correspondence: Dr. Paul H. Graf; Ball Aerospace and Technologies Corp.; PO Box 1062; Boulder CO, 80306; USA; phone: voice (303) 939-5538, fax (303) 939-6263; email pgraf@ball.com

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OPERATIONAL ENVIRONMENTAL  
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TO SAF/PAS

DATE 28 Jan 2000

FAX# (703) 697-0678

PHONE#

SUBJECT Public Disclosure Release of Abstract

FROM Capt Elisa Kang

PHONE# (301) 427-2084

COMMENTS:

x142

Thank you for your immediate attention.  
Please call if you have questions.

**TRANSMIT/ROUTE SLIP**

22 Dec 99

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**COMMENTS**

OMPS Abstract — Ball has okayed for public release.

☐ Continued on reverse

FROM (Name)	BUILDING, ROOM OR REFERENCE NO.	CODE AND EXTENSION
G. Crison		1412

Title: The Preliminary Design of the Ozone Mapping and Profiler Suite (OMPS)

Authors: GRAF, Paul H. (1); BECKER, Ira (1); CHRISP, Michael (1); DITTMAN, Michael G. (1); FOWLER, William (1); HENDERSHOTT, Paul (1); JAROSS, Glen (2); LARSEN, Jack (2); MEHALKO, Phil (1); MICHAELS, Dan (1); MINERVA, Vince (1); RATHBURN, Roger (1); RODRIGUEZ, Juan V. (1); SEFTOR, Colin (2); SCHWIESOW, Ron L. (1); SWISSLER, Tom (2); TARDE, Rich (1); TRUMBULL, Robert E. (1); WELLEMEYER, Charles (2)

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FOR OPEN PUBLICATION

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AND SECURITY REVIEW  
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FAX COVER SHEET

TO Juan Rodriguez DATE 18 Feb 00

FAX# 303-939-6263 PHONE # \_\_\_\_\_

SUBJECT Abstract Release

FROM Elisa Kang PHONE # \_\_\_\_\_

COMMENTS:

Juan - Ozone Symposium abstract  
is approved for release.

*Elisa*





# ILAS-II

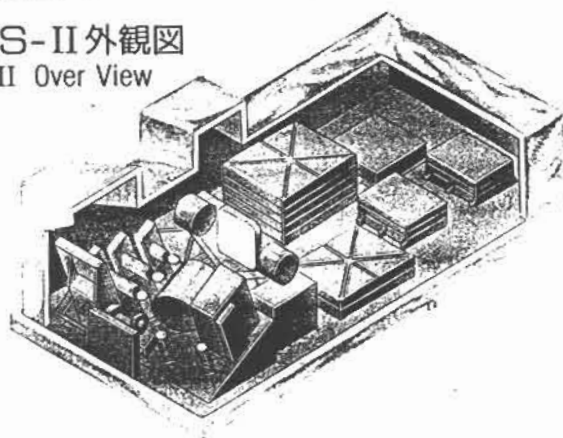
Improved Limb Atmospheric Spectrometer-II

## 改良型大気周縁赤外分光計-II

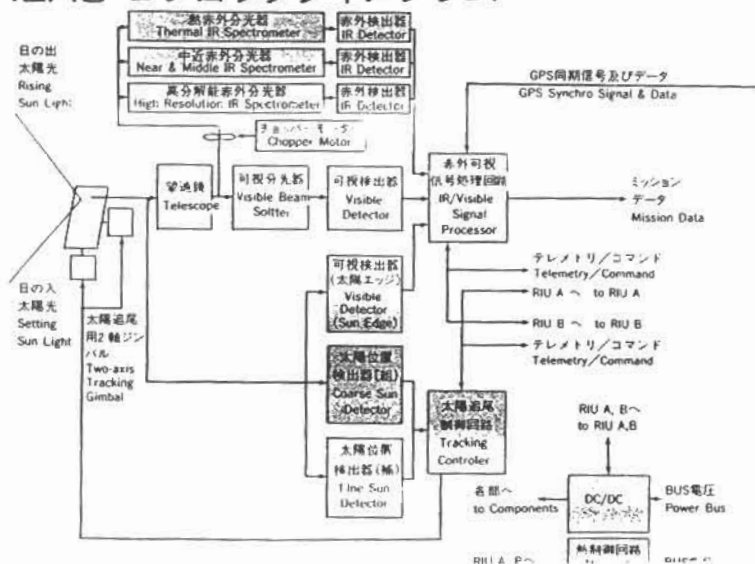
ILAS-IIは、南北両半球の高緯度地域の成層圏のオゾン層を監視・研究するため環境庁が開発する大気センサです。フロンガス等の影響で生じたオゾンホールに代表される成層圏の各種現象を長期観測することにより、オゾン層破壊に関する物理化学現象の科学的解明と特定フロン規制等の対策効果の検証を目的としています。ILAS-IIは対流圏上部から成層圏について、衛星の周回ごとの日の出、日の入り時に太陽を光源として大気周縁方向の大気成分濃度及び気温、気圧の高度分布を測定する(太陽掩蔽法)分光計です。測定には赤外3バンド(2-8  $\mu\text{m}$ , 7-12  $\mu\text{m}$ , 12.80-12.83  $\mu\text{m}$ )および可視バンド(753-784nm)の4つのバンドにおける吸収スペクトルを用います。ILAS-II は「おおぞら」(文部省宇宙科学研究所、1984年打上)搭載のLAS (Limb Atmospheric Spectrometer) を基本として開発されたILAS (ADEOS搭載、1996年打上予定) の機器構成を踏襲しながら、観測波長範囲を広げ、また鉛直分解能を高めています。ILAS-II での観測は、太陽同期軌道での衛星—太陽—地球の位置関係から両半球高度地域(北緯56-70°、南緯63-88°)に限定されます。

### ILAS-II 外観図

ILAS-II Over View



### ILAS-II ブロックダイアグラム



Improved Limb Atmospheric Spectrometer II (ILAS-II) developed by Environment Agency of Japan is a sensor to monitor the high-latitude stratospheric ozone. The objectives of ILAS-II are to monitor and study changes in the stratosphere which are triggered by emissions of chlorofluorocarbons (CFC), and to evaluate the effectiveness of world-wide emission controls of CFCs. ILAS-II is a spectrometer which observes the atmospheric limb absorption spectrum from the upper troposphere to the stratosphere using sunlight as a light source (solar occultation technique). The spectrometer covers the infrared region (2-13  $\mu\text{m}$ ) and the near visible region (753 to 784nm). ILAS-II was designed to improve observation accuracy and cover wider spectral ranges than ILAS (aboard ADEOS planned for 1996 by NASDA) which was based on LAS aboard EXOS-C (Ohzora, ISAS, 1984). ILAS's observations are focused on the high latitude regions because of the geometrical relation of the solar occultation events with the sun-synchronous orbit. From these spectral observations, ILAS-II can measure the vertical profiles of species related to ozone hole phenomena: ozone ( $\text{O}_3$ ), nitrogen dioxide ( $\text{NO}_2$ ), aerosols, water vapor ( $\text{H}_2\text{O}$ ), CFC11, methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ), chlorine niterate ( $\text{ClONO}_2$ ), temperature, and pressure.

### ILAS-II 主要諸元

観測スペクトル範囲	CH1: 7.14-11.76 $\mu\text{m}$ (1400-850 $\text{cm}^{-1}$ ) CH2: 2-8 $\mu\text{m}$ (5000-1250 $\text{cm}^{-1}$ ) CH3: 12.80-12.83 $\mu\text{m}$ (781-779 $\text{cm}^{-1}$ ) CH4: 753-784nm
測定高度	10-60km (雲頂高度から250kmまでを連続測定)
高度分解能	1 km
濃度鉛直分布制度	5% (オゾンについては、1%) (解析処理による誤差を含まない)
測定領域	北半球: 56-70°、南半球: 63-88°
分光方式	CH1: 平面回折格子分光器 CH2: プリズム分光器 CH3: 平面回折格子分光器 CH4: 凹面回折格子分光器
観測対象	$\text{O}_3$ , $\text{HNO}_3$ , $\text{CH}_4$ , $\text{N}_2\text{O}$ , $\text{H}_2\text{O}$ , CFC-11, CFC-12, $\text{ClONO}_2$ , $\text{NO}_2$ , エアロゾル, 気温, 気圧

### ILAS-II Main Characteristics

Spectral Coverage	CH1: 7.14-11.76 $\mu\text{m}$ (1400-850 $\text{cm}^{-1}$ ) CH2: 2-8 $\mu\text{m}$ (5000-1250 $\text{cm}^{-1}$ ) CH3: 12.80-12.83 $\mu\text{m}$ (781-779 $\text{cm}^{-1}$ ) CH4: 753-784 nm
Spatial Coverage (height)	10-60 km
Vertical Resolution	1 km
Observation Accuracy (Vertical Distribution of Concentration)	5% (1% to Ozone) (Processing Error is not included)
Observation Region	N 56-70°, S 63-88°
Spectrometer	CH1: Grating Spectrometer CH2: Prism Spectrometer CH3: Grating Spectrometer CH4: Concave Grating Spectrometer
Observation Parameters	$\text{O}_3$ , $\text{HNO}_3$ , $\text{CH}_4$ , $\text{N}_2\text{O}$ , $\text{H}_2\text{O}$ , CFC-11, CFC-12, $\text{ClONO}_2$ , $\text{NO}_2$ , Aerosols